

Appl. No. 10/657,230
Amendment dated: June 28, 2004
Reply to OA of: March 1, 2004

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1(currently amended). A flip chip package comprising:
a lead frame having a die paddle and a plurality of leads surrounding the die paddle;
a chip having an active surface and a back surface opposed to the active surface, wherein the active surface has a first bonding pad and a second bonding pad;
and
a plurality of first bumps and second bumps formed on the first bonding pads and the second bonding pads respectively, the active surface of the chip facing the lead frame and electrically connecting the die paddle and the leads by the first bumps and the second bumps respectively, wherein the lead frame further comprises a concavity, which connects one of the first bumps and the second bumps.

Claim 2(canceled).

3(currently amended). The flip chip package of claim [[2]] 1, wherein one of the first bumps connects the first concavity and one of the first bonding pads.

4(original). The flip chip package of claim 3, further comprising a first adhesive filled in the first concavity and connecting the first concavity and one of the first bumps.

Claim 5(canceled).

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6(currently amended). The flip chip package of claim [[5]] 1, further comprising a second adhesive filled in the second concavity and connecting the second concavity and one of the second bumps.

7(original). The flip chip package of claim 1, wherein the first bumps are electrically conductive bumps.

8(original). The flip chip package of claim 1, wherein the second bumps are electrically conductive bumps.

9(original). The flip chip package of claim 1, wherein the first bumps are thermally conductive bumps.

10(original). The flip chip package of claim 1, wherein the first bumps are solder bumps.

11(original). The flip chip package of claim 1, wherein the second bumps are solder bumps.

12(original). The flip chip package of claim 1, further comprising an underfill filled in a gap between the active surface of the chip and the lead frame.

13(original). The flip chip package of claim 1, further comprising a heat spreader mounted on the back surface of the chip.

14(original). The flip chip package of claim 1, further comprising a heat transmission layer disposed on the back surface of the chip.

15(currently amended). A flip chip package, comprising:

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a lead frame having a die paddle, a plurality of leads surrounding the die paddle and a tie bar connected the die paddle;

a chip having an active surface and a back surface opposed to the active surface, wherein the active surface has a first bonding pad and a second bonding pad; and

a plurality of first bumps and second bumps formed on the first bonding pads and the second bonding pads respectively, wherein the active surface of the chip faces the lead frame and electrically connects the tie bar and the leads by the first bumps and the second bumps respectively,

wherein the lead frame further comprises a concavity, which connects one of the first bumps and the second bumps.

16(original). The flip chip package of claim 15, wherein the tie bar further comprises a first concavity formed thereon.

Claim 17(canceled).

18(currently amended). The flip chip package of claim ~~[[17]]~~ 15, further comprising a first adhesive filled in the first concavity and connecting the first concavity and one of the first bumps.

19(original). The flip chip package of claim 15, wherein one of the leads has a second concavity connecting one of the second bumps.

20(original). The flip chip package of claim 19, further comprising a second adhesive filled in the second concavity and connecting the second concavity and one of the second bumps.

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21(original). The flip chip package of claim 15, wherein the first bumps are electrically conductive bumps.

22(original). The flip chip package of claim 15, wherein the second bumps are electrically conductive bumps.

23(original). The flip chip package of claim 15, wherein the first bumps are thermally conductive bumps.

24(original). The flip chip package of claim 21, wherein the first bumps are solder bumps.

25(original). The flip chip package of claim 22, wherein the second bumps are solder bumps.

26(original). The flip chip package of claim 15, further comprising an underfill filled in a gap between the active surface of the chip and the lead frame.

27(original). The flip chip package of claim 15, further comprising a heat spreader mounted on the back surface of the chip.

28(original). The flip chip package of claim 15, further comprising a heat transmission layer disposed on the back surface of the chip.

29(new). A flip chip package, comprising:
a lead frame having a die paddle and a plurality of leads surrounding the die paddle;

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a chip having an active surface and a back surface opposed to the active surface, wherein the active surface has a first bonding pad and a second bonding pad; and

a plurality of first bumps and second bumps formed on the first bonding pads and the second bonding pads respectively, the active surface of the chip facing the lead frame and electrically connecting the die paddle and the leads by the first bumps and the second bumps respectively,

wherein the lead frame further comprises a concavity, which connects one of the first bumps and the second bumps.

30(new). The flip chip package of claim 29, wherein one of the first bumps connects the first concavity and one of the first bonding pads.

31(new). The flip chip package of claim 30, further comprising a first adhesive filled in the first concavity and connecting the first concavity and one of the first bumps.

32(new). The flip chip package of claim 29, further comprising a second adhesive filled in the second concavity and connecting the second concavity and one of the second bumps.

33(new). The flip chip package of claim 29, wherein the first bumps are electrically conductive bumps.

34(new). The flip chip package of claim 29, wherein the second bumps are electrically conductive bumps.

35(new). The flip chip package of claim 29, wherein the first bumps are thermally conductive bumps.

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36(new). The flip chip package of claim 29, wherein the first bumps are solder bumps.

37(new). The flip chip package of claim 29, wherein the second bumps are solder bumps.

38(new). The flip chip package of claim 29, further comprising an underfill filled in a gap between the active surface of the chip and the lead frame.

39(new). The flip chip package of claim 29, further comprising a heat spreader mounted on the back surface of the chip.

40(new). The flip chip package of claim 29, further comprising a heat transmission layer disposed on the back surface of the chip.

41(new). A flip chip package, comprising:
a lead frame having a die paddle, a plurality of leads surrounding the die paddle and a tie bar connected the die paddle;
a chip having an active surface and a back surface opposed to the active surface, wherein the active surface has a first bonding pad and a second bonding pad; and
a plurality of first bumps and second bumps formed on the first bonding pads and the second bonding pads respectively, wherein the active surface of the chip faces the lead frame and electrically connects the tie bar and the leads by the first bumps and the second bumps respectively,
wherein one of the leads has a second concavity, which connects one of the second bumps.

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42(new). The flip chip package of claim 41, further comprising a second adhesive filled in the second concavity and connecting the second concavity and one of the second bumps.

43(new). The flip chip package of claim 41, wherein the tie bar further comprises a first concavity formed thereon.

44(new). The flip chip assembly package of claim 43, wherein one of the first bumps connects the first concavity and one of the first bonding pads.

45(new). The flip chip package of claim 44, further comprising a first adhesive filled in the first concavity and connecting the first concavity and one of the first bumps.

46(new). The flip chip package of claim 41, wherein the first bumps are electrically conductive bumps.

47(new). The flip chip package of claim 41, wherein the second bumps are electrically conductive bumps.

48(new). The flip chip package of claim 41, wherein the first bumps are thermally conductive bumps.

49(new). The flip chip package of claim 46, wherein the first bumps are solder bumps.

50(new). The flip chip package of claim 47, wherein the second bumps are solder bumps.

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51(new). The flip chip package of claim 41, further comprising an underfill filled in a gap between the active surface of the chip and the lead frame.

52(new). The flip chip package of claim 41, further comprising a heat spreader mounted on the back surface of the chip.

53(new). The flip chip package of claim 41, further comprising a heat transmission layer disposed on the back surface of the chip.